APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/887,651	06/21/2001	Kenneth J. Hill	30566.126-US-U1	7098

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EXAMINER
NGUYEN, KIMBINH T

ART UNIT	PAPER NUMBER
2671	

DATE MAILED: 08/27/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE **3** MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 June 2001* .

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-57* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-57* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 June 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

    If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

       1.☐ Certified copies of the priority documents have been received.

       2.☐ Certified copies of the priority documents have been received in Application No. _____ .

       3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

    a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .

4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: .

DETAILED ACTION

1.   Claims 1-57 are pending in the application.

Claim Rejections - 35 USC § 103

2.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3.   Claims 1, 3-7, 11, 12, 14-20, 22-26, 30, 31, 33-39, 41-45, 49, 50 and 52-57 are

rejected under 35 U.S.C. 103(a) as being unpatentable over Sowar (5,351,196).

Claim 1, Sowar et al. discloses generating a planar profile of curves (generating

a slicing plane which is intersected with the solid modeling faces to determine the

curves representing regions that the tool may enter; col. 3, lines 24-26 or organizing the

curve into profiles, col. 13, lines 9-10); sweeping the profile (constraint curve profile)

along a specified path (tool path) to generate a tool body (tool volume; col. 14, lines 9-

12); terminating the swept profile (if all delta volumes have been removed, the process

terminates, col. 14, lines 36-37) when the tool body interacts with blank bodies to a

predefined extent (this is done (or terminated) by projecting the constraint profile

through the z extent of the delta volume. Constraint volumes (tool body) intersected

(interacted) with the delta volume (blank bodies), col. 11, lines 44-60); Sowar does not

teach predefined extent; however, Sowar teaches z extents are needed to determine

start and stop positions for slicing and control (this related to predetermined z extent for

stopping or terminating the profile; col. 11, lines 19-27). Therefore, it would have been

obvious to one of ordinary skill in the art at the time the invention was made to utilize the

Sowar' s teaching for utilizing z-extent to stop or terminate the constraint profile by using

standard interactive techniques, because it would provide a method for automatically

generating finishing tool paths for all or portions of delta volumes in a CAD/CAM

environment (col. 6, lines 40-42).

Claims 3-7, Sowar et al. discloses the pre-processing labels (or marks) faces

and edges of the tool (part model; col. 8, lines 25-29) and blank bodies (stock model;

col. 9, lines 13-14); tracking which faces came from which body (col. 9, lines 28-29);

propagate edge attributes for each face (manufacturing attributes can range from simple

to complex to the face, see col. 8, lines 30-35); the faces and edges are labeled with

attributes (col. 3, lines 15-18); construct a blank body (well-defined the raw stock

models, col. 4, lines 16-19).

Claims 11 and 12, Sowar et al. teaches the analysis performs label propagation

(attributes can range from simple to complex) in which marking of faces as a from-face

or to-face adjacent to faces originally marked as from-faces and to-faces (one or more

cutting tools, selection of the machining operation through each machining stage, see

col. 8, lines 30-50); handling a specific termination type relative to the bodies (delta

volumes, col. 14, lines 36-41).

Claims 14-17, Sowar et al. discloses results from the analysis according to the

Boolean operation (col. 3, lines 42-53); a truncated tool body (the stock model that will

be cut or remove on the machine tool) computed as union of cells of the tool body (solid models stock model, delta volumes, machining setup models, col. 4, lines 17-24); a truncated (subtracted) tool body computed from the Boolean of the tool body (part model) with a blank body (stock model), a target body (delta volume) (col. 4, lines 34-36; col. 9, lines 17-27).

Claim 18, Sowar et al. discloses the tool body interacts (intersects) with the blank bodies according to Boolean selected from a group comprising a joining (union) of the tool body (tool volume) with blank bodies (delta volume), a cutting operation (cutting tool to subtract or remove) of the tool body from the blank bodies (col. 2, lines 60-66).

Claim 19, Sowar et al. discloses the tool body is generated by sweeping the profile (tool volume, col. 14, lines 6-12), the tool body extends to a predefined length (z-extend from minimum to maximum z-coordinates values, col. 11, lines 19-27); the tool body extends through the blank body, but no further (from maximum to minimum z); the tool body extents to a first face on the blank body, wherein the first face cuts the tool body; the tool body extends up to, but does not penetrate, a selected face (constraint volumes intersected with the delta volume define the volume which the stool must stay within; see col. 11, line 44 through col. 12, line 7); the tool body is swept between two selected faces (col. 14, lines 9-12).

Claims 20 and 39, the rationale provide in the rejection of claim 1 is incorporated herein.

Claims 22-26, 30, 31, 33-38, 41-45, 49, 50 and 52-57, the rationale provided in the rejection of claims 3-7, 11, 12 and 14-19 is incorporated herein.

4.   Claims 2, 8-10, 13, 21, 27-29, 32, 40, 46-48 and 51 are rejected under 35 U.S.C.

103(a) as being unpatentable over Sowar (5,351,196) in view of Ji et al. "Machine

Interpretation of CAD Data for Manufacturing Applications", ACM published September

1997, pages 264-311.

Claim 2, Ji et al. discloses creating a cellular topology graph of the tools

(pockets, slots, holes, steps, fig. 1) and blank bodies (raw stock bounded volume; see

section 2.1, pages 270-273; fig. 4); extracting tool and blank graphs (parts) from the

cellular topology graph (see section 4.1.2, the left column of page 278); performing a

post-processing phase to integrate results from the extracted tool and blank graphs

(parameter extraction obtains the position, orientation and dimensions of the features.

Adjacent features may be combined to form compound features for a hierarchy of

features, see the left column of page 286). It would have been obvious to one of

ordinary skill in the art at the time the invention was made to utilize a cellular topography

graph of the tools and apply a method of parameter extraction taught by the Ji's

teaching into the tool paths of the Sowar' s system for building a topography graph of

the tools and blank bodies, because the advantage of a hierarchical description

(topography graph) of the extracted features is that it provides a more global view of the

part which can be used in CAD/CAM evaluation of designs (see the bottom on the left

column of page 277). Further, **claims 8-10 and 13**, Ji et al. also teaches the pre-

processing performs cellular decomposition on the tool body and blank body to create

. the cellular topology graph (cell decomposition, see the left column of page 271); adding

termination vertices to the tool graph (The concepts of adding and subtracting

elementary volumes, see the right column of page 271 to page 272, fig. 4d); deriving

bundle graphs from the tool graph that to determine the potential "from" and "to"

termination ("through step", "through slot", see fig. 1a, page 267; fig. 7, page 279); a

graph whose vertices represent cells used to create an output body (fig. 4d).

Claims 21, 27-29, 32, 40, 46-48 and 51, the rationale provided in the rejection of

claims 2, 8-10 and 13 is incorporated herein.

Conclusion

5.   The prior art made of record and not relied upon is considered pertinent to

applicant's disclosure.

-       Shinagawa et al. (6,323,863) discloses object structure graph

        generation and data conversion using the same.

-       Han et al. (6,392,645) discloses 3D geometric modeling system.

-       Hanratty (5,990,897) discloses method for automatically generating a

        3D geometric solid from 2D view sets including automatic segregation

        of open, closed and disjoint curves into views using their center of

        gravity.

6.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to **Kimbinh Nguyen** whose telephone number is **(703)**

305-9683. The examiner can normally be reached **(Monday- Thursday from 7:00 AM**

to 4:30 PM and alternate Fridays from 7:00 AM to 3:30 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Mark Zimmerman, can be reached at (703) 305-9798.

Any response to this action should be mailed to:

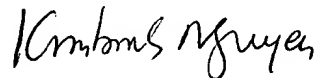Commissioner of Patents and Trademarks

Washington, D.C. 20231

Or faxed to:

(703) 872-9314 (for Technology Center 2600 only)

Hand-delivered responses should be brought to Crystal Part II, 2121 Crystal Drive,

Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or

proceeding should be directed to the Technology Center 2600 Customer Service Office

whose telephone number is (703) 306-0377.

August 12, 2003

Kimbinh Nguyen

Patent Examiner AU 2671